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EXAMINER

THOMPSON, CAMIE S

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 10/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/995,816	Applicant(s) PARK ET AL.	
	Examiner Camie S. Thompson	Art Unit 1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment filed July 21, 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14, 16 and 19 is/are allowed.
- 6) ☒ Claim(s) 1-13, 17, 18 and 20-25 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. Applicant's amendment and accompanying remarks filed July 21, 2005 have been acknowledged.
2. The rejection of claims 2-12 under 35 U.S.C. 112, second paragraph is withdrawn due to applicant's submission of the amendment.

Claim Objections

3. Claims 3, 8, 15 and 17 are objected to because of the following informalities:

Claim 3 should be "(Previously Presented)".

Claim 8: line 3, perylene is misspelled.

Claim 15, line 4, the term "comprising" should be deleted.

Claim 17, line 4, the term "a" should be "an".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

5. Claims 2-13, 17 and 24-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 2 is rendered indefinite because it is unclear as to whether or not the hole injecting layer is required for the structure of the device. Claim 2 recites a second electrode deposited over the electron injecting layer. Additionally, claim 2 recites that at least one of a hole injecting layer and an electron injecting layer. The electron injecting layer is required but it is unclear if the hole injecting layer is required.

Claims 11 and 13 are rendered indefinite because Formulae (III) and (IV) in claim 11 and formulae (I) and (II) in claim 13, meet the x limitation of the independent claims since ethylene is $x=2$ and propylene is $x=3$, but do not appear to meet the y limitation of the independent claims. In order to meet the y limitation, either EO and PO have to represent polyethylene oxide and polypropylene oxide, respectively.

Claim 17 is rendered indefinite. The structure of the device is not clear. It is unclear how the metal electrode can be on the electron injecting layer if the emissive layer is on the electron injecting layer and the electron injecting layer is on the semitransparent electrode.

Claim 25 is rendered indefinite because the two formulae set forth in the claim meet the x limitation of claim 2 from which it depends, but do not meet the y limitation of claim 2.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

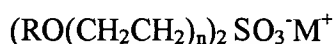
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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Claims 1-9, 12, 18 and 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Cao, U.S. Patent Number 5,965,281.

Cao discloses an electroluminescent device comprises a transparent substrate, an anode and active layer comprising an electrically active polymer and a cathode (see column 10, lines 15-50). Additionally, the Cao reference discloses that the device can comprise an electron injection layer and the anode can serve as a hole injection layer when the work function is above 4.5 eV (see column 4, lines 10-12 and column 10, lines 15-21). Column 4, lines 10-12 of the reference discloses that the device can comprise mixtures of the electrically active polymer and additive in the active layer (luminescent layer) or in the electron injecting layer. Column 6, line 48-column 7, line 35 of the Cao reference discloses polymers such as anthracene, rubene, poly(p-phenylene vinylene), polyarylenes that can be used in the active layer. Column 7, line 36-column 8, line 37 of the reference discloses an additive that can be used in the electron injection layer that has at least one block of $[O-(CH_2)_x]_y$ wherein x and y are integers equal to or greater than 2 and movable ion and a non-movable ionic moiety such as



wherein R can be an alkylaryl; M is a cation and n is an integer from 2 to 40. Also, the reference discloses that the anode can include materials such as indium tin oxide, lead oxide, doped polyaniline or doped polypyrrole (see column 10, lines 15-35). Also, the reference discloses that the anode layer is semitransparent. It is disclosed in column 10, lines 39-50 that the cathode comprises materials that include aluminum, silver, copper or indium. Example 1 of the Cao reference discloses a glass substrate.

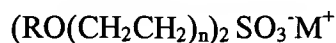
Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao, U.S. Patent Number 5,965,281.

Cao discloses an electroluminescent device comprises a transparent substrate, an anode and active layer comprising an electrically active polymer and a cathode (see column 10, lines 15-50). Additionally, the Cao reference discloses that the device can comprise an electron injection layer and the anode can serve as a hole injection layer when the work function is above 4.5 eV (see column 4, lines 10-12 and column 10, lines 15-21). Column 4, lines 10-12 of the reference discloses that the device can comprise mixtures of the electrically active polymer and additive in the active layer (luminescent layer) or in the electron injecting layer. Column 6, line 48-column 7, line 35 of the Cao reference discloses polymers such as anthracene, rubene, poly(p-phenylene vinylene), polyarylenes that can be used in the active layer. Column 7, line 36-column 8, line 37 of the reference discloses an additive that can be used in the electron injection layer that has at least one block of $[O-(CH_2)_x]_y$ wherein x and y are integers equal to or greater than 2 and movable ion and a non-movable ionic moiety such as



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wherein R can be an alkylaryl; M is a cation and n is an integer from 2 to 40. Also, the reference discloses that the anode can include materials such as indium tin oxide, lead oxide, doped polyaniline or doped polypyrrole (see column 10, lines 15-35). Also, the reference discloses that the anode layer is semitransparent. It is disclosed in column 10, lines 39-50 that the cathode comprises materials that include aluminum, silver, copper or indium. Example 1 of the Cao reference discloses a glass substrate. The Cao reference does not specifically disclose the conductivity of the hole injecting layer or electron injecting layer. The conductivity of the electron injecting layer is dependent upon the proportion of different components in the layer. Cao discloses that the electron injecting layer can comprise mixtures of the electrically active polymer. Therefore, it would have been obvious to one of ordinary skill in the art to have conductivity greater than 1×10^{-8} s/cm as a matter of routine experiment *in re Boesch*, 617 F.2d, 272, 205 USPQ 215 (CCPA 1980).

9. Claims 14, 16 and 19 are allowed. The prior art does not provide for an electroluminescent device comprising:

- a transparent substrate;
- a semitransparent electrode deposited on the transparent substrate;
- a hole-injecting layer positioned on the semitransparent electrode, the hole injecting layer comprising a polymeric compound and a movable anion, the polymeric compound having at least one block of $[O-(CH_2)_x]_y$ units and at least one non-movable cationic moiety, wherein x is an integer equal to or greater than two, wherein y is an integer equal to or great than two;

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an emissive layer comprising an organic electroluminescent material, positioned on the hole injecting layer;

an electron injecting layer positioned on the emissive layer, the electron injecting layer comprising a polymeric compound and a movable cation, the polymeric compound having at least one block of $[O-(CH_2)_{x'}]_{y'}$ units and at least one non-movable anionic moiety, wherein x' is an integer equal to or greater than two, wherein y' is an integer equal to or greater than two; and

a metal electrode deposited on the electron injecting layer.

Also, the prior art does not provide for an electroluminescent device comprising:

a transparent substrate;

a semitransparent electrode deposited on the transparent substrate;

a hole-injecting layer positioned on the semitransparent electrode, the hole injecting layer comprising a polymeric compound and a movable anion, the polymeric compound having at least one block of $[O-(CH_2)_x]_y$ units and at least one non-movable cationic moiety, wherein x is an integer equal to or greater than two, wherein y is an integer equal to or great than two;

an emissive layer comprising an organic electroluminescent material, positioned on the hole injecting layer;

a metal electrode deposited on the emissive layer.

10. Claim 15 would be allowable upon correction of the informality noted above.


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Response to Arguments

11. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection. Examiner is providing a complete action in response to amendment filed August 30, 2004. The amendment filed August 30, 2004 was incomplete. Claims 1-25 have been examined.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Camie S. Thompson whose telephone number is (571) 272-1530. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena L Dye, can be reached at (571) 272-3186. The fax phone number for the Group is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


RENA DYE
SUPERVISORY PATENT EXAMINER
A.U. 1774 10/27/05